

What is Claimed:

1. A method of delivering cardioplegia solution to the coronary arteries even in the presence of aortic valve incompetence, comprising the steps of:

puncturing the ascending aorta at a puncture position between a cross-clamp above the coronary arteries and the left ventricle using a coaxial needle inserted through a lumen of a cardioplegia cannula;

removing the coaxial needle from the cardioplegia cannula;

inserting the cardioplegia cannula into the ascending aorta at the puncture position, the cannula including a first lumen for cardioplegia delivery and a second lumen adapted to accept a folded non-porous membrane that is adapted to cover the aortic valve when opened;

inserting a folded membrane into the second lumen and advancing the folded membrane until the membrane is within the ascending aorta just above the aortic valve;

opening the membrane and advancing the membrane until it covers the aortic valve at a deployment position; and

inserting the cardioplegia solution into the first lumen, whereby the membrane prevents the cardioplegia solution from entering the left ventricle through the aortic valve.

2. The method of claim 1, wherein the membrane comprises a balloon occluder, wherein said opening step comprises the step of inflating said balloon occluder.

3. A cardioplegia cannula for delivering cardioplegia solution to the coronary arteries even in the presence of aortic valve incompetence, comprising:

an elongated tube comprising at least first and second lumens, at least one of said lumens being adapted to accept a coaxial needle for puncturing the ascending aorta at a puncture position between a cross-clamp above the coronary arteries and the left ventricle, and at least one of said lumens being adapted for cardioplegia delivery; and

a foldable non-porous membrane that is adapted to advance through one of said first and second lumens not used for cardioplegia delivery, through the puncture site and into said ascending aorta, said membrane adapted to cover the aortic valve when opened whereby, when deployed, the membrane prevents the cardioplegia solution from entering the left ventricle through the aortic valve when the cardioplegia solution is inserted into the ascending aorta via the lumen used for cardioplegia delivery.

4. A cardioplegia cannula as in claim 3, wherein the membrane is an umbrella that is opened using a wire that is inserted into the one lumen not used for cardioplegia delivery.
5. A cardioplegia cannula as in claim 4, wherein the umbrella and the wire are made of nitinol.
6. A cardioplegia cannula as in claim 3, wherein the membrane is a nitinol ring that may be compressed for insertion into the one lumen not used for cardioplegia delivery and that is adapted to spring open when it emerges from a distal end of the elongated tube.
7. A cardioplegia cannula as in claim 3, wherein the membrane comprises a balloon occluder that is inflated once it has been deployed just above the aortic valve but below the coronary ostia so as to occlude the ascending aorta.